

METHOD AND SYSTEM FOR REPRESENTATION OF GEOGRAPHICAL FEATURES IN A COMPUTER-BASED SYSTEM

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ABSTRACT OF THE DISCLOSURE

Cartographic data is represented using polynomial splines. To improve representation accuracy and reduce storage requirements, a database storing data points (shape points and nodes) is converted into a database of spline control points. The data points can consist of coordinate triples (longitude, latitude, altitude) or coordinate pairs (longitude, latitude) specifying locations along geographic features. The spline control points are computed by fitting a polynomial spline to the geographic features using a least squares approximation. The least squares approximation minimizes the mean squared error between the spline and the data points. Regularization can be employed to make the least squares approximation better conditioned. Bearing values and selective weighting of the end nodes can be included in the least squares approximation to improve the continuity of spline curves at the ends of geographic features. The control points associated with each geographic feature are stored in a computer-usable database. The geographic features can be displayed by computing the spline functions using the stored control points. Uniform and nonuniform nonrational B-splines, uniform and nonuniform Catmull-Rom splines and NURBS are some examples of splines that can be used to represent the geographic features. The number of spline control points is configurable to permit the desired level of accuracy.